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CLASSIFICATION OF THE FOSSORIAL, PREDACEOUS AND PARASITIC WASPS, OR THE SUPERFAMILY VESPOIDEA.

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(Paper No. 8.—Continued from p. 210.)

FAMILY XXX.—Masaridæ.

Prof. Westwood and others confused these wasps with the Vespidæ and the Eumenidæ, although Latreille had years previously established his family Masarides. Henry de Saussure, in his "Etudes," treats them as a tribe. They, however, represent a distinct family close to the Eumenidæ, but easily separated from them and the Vespidæ by the wings not being folded longitudinally, by peculiarities of the antennæ, which are usually strongly clavate at tip; by the wholly different abdomen, the venter being flatter; and by the much larger scutellum.

Of the habits of the Masarides nothing seems to be positively known. Some years ago Dr. Dyar gave me specimens of *Masaris vespoides*, Cr., bred from what I take to be the nest of an Odynerine, taken in Arizona.

Table of Genera.

1. Front wings with *two* cubital cells (Masarini).....3.
   Front wings with *three* cubital cells (Euparagiini).....2.
2. Second cubital cell receiving both recurrent nervures; antennæ in ♀ short, clavate, ♂ unknown; scape not long.....(1) Paramasaris, Cameron.
   (Type P. fuscipennis, Cam.)

   Second and third cubital cells each receiving a recurrent nervure; antennæ not clavate in both sexes, in ♂ subfiliform; scape very long.....(2) Euparagia, Cresson.
   (Type E. scutellaris, Cress.)

3. Labrum extensible..... 8.
Labrum *not* extensible.
Maxillary palpi wanting or rudimentary, or 3-jointed.....7.
Maxillary palpi *not* rudimentary, 4- to 6-jointed; labial palpi 4-jointed.....4

4. Maxillary palpi 4-jointed.....5.
Maxillary palpi 6-jointed. Labial palpi stout, the last three joints united scarcely as long as the first; claws with a strong tooth beneath; mandibles 3-dentate.....(3) Paragia Shuekard.
(Type P. decipiens, Shuck.)

5. First abdominal segment small; clypeus in ♂ transverse.....6.
First abdominal segment nearly as long as the second; clypeus in ♂ longer than wide; mandibles obliquely truncate, 3- or 4-dentate.....(4) Paraceramius, Saussure.
(Type P. spiricornis, Sauss.)

6. Abdominal segments *not* constricted at base; marginal cell *with* an appendage, the second cubital cell about twice as long as wide.....(5) Ceramius, Latreille.
(Type C. Fonscolombei, Latr.)

Abdominal segments constricted at base as in the genus *Cerceris*, Latr.; marginal cell *without* an appendage.....(6) Ceramioides, Saussure.
(Type C. cerceriformis, Sauss.)

7. Second cubital cell subquadrate, not or scarcely longer than wide.
Labial palpi 4-jointed; labium long; maxillary palpi rudimentary, 3-jointed; mandibles rather short and acute; claws unidentate.....(7) Jujurtha, Saussure.
(Type Celonites oraniensis, Lepel.)

Labial palpi 3-jointed; labium short, bifid; maxillary palpi wanting; mandibles somewhat acute at apex; claws simple.....(8) Trimeria, Saussure.
(Type T. Americana, Sauss.)

8. Marginal cell *with* an appendage.....10.
Marginal cell *without* an appendage.
Eyes in ♂ normal, the lateral ocelli away from the eye margin..9.
Eyes in ♂ abnormal, very strongly converging above or holoptic, the lateral ocelli touching the eye margin (♀ unknown).

Scape large, globular, the pedicel annular; flagellum very long, terminating in a large club, joints 1 to 5 elongate, slender, cylindrical, the first joint shorter than either joints 2 or 3 ..... Masaris, Fabr. (partim).
(?) ♂ M. Texana, Cr., (?) g. nov.

9. Scape and pedicel large, globular, nearly equal; first joint of flagellum longer than either 2 or 3; labium long; maxillary palpi rudimentary, 3-jointed; mandibles short and acute; first joint of hind tarsi *not* as long as all the other joints united; claws with a tooth ..... (9) Celonites, Latreille.
(Type Vespa abbreviata, Villers.)

Scape elongate, the pedicel small; flagellum in ♂ elongate, joints 2 to 6 elongate, cylindrical, subequal, in ♀ short, the first joint as long as 2–4 united, the latter being very short; first joint of hind tarsi elongate, as long as all the following united; claws simple, *without* a tooth ..... (10) Masaris, Fabricius.
(Type M. vespiformis, Fabr.)

10. Scape not elongate, hardly thrice as long as thick, the pedicel annular; first joint of flagellum in ♀ as long as joints 2–3 united, in ♂ with joints 1 to 4 elongate; first joint of hind tarsi a little longer than all the following joints united, the second and third only a little longer than thick; claws long, simple ..... (11) Pseudomasaris, Ashmead, g. nov.
(Type Masaris occidentalis, Cress.)

Scape elongate, about four times as long as thick, the pedicel hardly longer than thick; first joint of flagellum in ♀ not longer than 2–3 united; first joint of hind tarsi shorter than all the following joints united; claws very small .. .. (12) Quartinia, Gribodo.
(Type Q. dilecta, Gribodo.)

Family XXXI.—Chrysididæ.

1825. Chrysides, Cinquieme Tribe, Latreille. Fam. Nat. Regn Anim., p. 448.
1830. Chrysides, Tribe VIII., Leach. Edinb. Ency., IX., p. 146.
1839. Chrysidæ, Fam. 18, Haliday. Hym. Syn., p. ii.
1845. Chrysidiformes, Dahlbom. Hym. Enc., II., p. 2.
1877. Chrysostilba, Tribe 13, Förster. Ueber d. Syst. Werth d. Flügelg. bei den Hym., p. 20

Abroad, the wasps belonging to this family are known as "ruby-tailed flies" and "gold-wasps."

Cuckoo wasps is a better name for them. They are among the handsomest of all wasps, being most frequently of a brilliant metallic green, blue-green, blue, purplish or cupreous; they are rarely wholly black, and still more rarely variegated with yellow or testaceous.

All the species are parasitic or inquilinous, principally in the nests of bees and wasps. The potter-wasps *(Eumenidæ)* and the leaf-cutting bees *(Megachilidæ*, subfamily Osmiinæ) are especially subject to their attacks; they have also been bred from the nests of other bees and wasps, and a few are said to have been bred from the larvæ of sawflies (Tenthredinoidea).

Dahlbom was among the first to separate the family into groups, which he called families. He established six families: (1) *Cleptidæ*, (2) *Elampidæ*, (3) *Hedychridæ*, (4) *Chrysididæ*, (5) *Euchrœidæ*, and (6) *Parnopidæ*. All of these, except the *Euchrœidæ*, are natural groups, recognized to-day as subfamilies, and he, and not Aaron and Mocsary, should receive credit for first pointing them out.

In 1889 an excellent monograph of this family, entitled "Monographia Chrysidarum orbis terrarum universi," was published by Alexander Mocsary, at Buda-Pesth, Hungary. It is a large 4to, of 643 pages, illustrated with two plates, gives a full bibliography of the family, tables for recognizing the subfamilies and genera, and terminates with a list of the hosts from which these wasps have been bred. It is the best work ever published on the family, and will be found indispensable to the student.

Mocsary, in this work, recognized *seven* subfamilies: (1) *Amiseginæ*, (2) *Cleptinæ*, (3) *Allocoelinæ*, (4) *Ellampinæ*, (5) *Hedychrinæ*, (6) *Chrysidinæ*, and (7) *Parnopinæ*.

In 1890, after this work had been published, Mocsary established another subfamily, the *Adelphinæ*, based upon a Mexican genus, *Adelphe*, placing it next to the *Amiseginæ*. In my opinion this subfamily does not represent a natural group, and I have here merged it with the *Cleptinæ*.

It will also be observed that I have not followed Mocsary in his arrangement of the subfamilies. My reasons for this are simple. I believe the family *Chrysididæ*, through the *Cleptinæ* and the *Amiseginæ*, is quite closely allied to the family *Bethylidæ*, and by the arrangement here proposed, a very natural transition into this family is shown. The *Parnopinæ*, although very far removed, appear to me to approach nearest

to the *Masaridæ* and the *Eumenidæ*, and hence I begin with them, rather than with the *Amiseginæ*, as Mocsary has done.

This paper was ready for publication when I received the July No. of Zeitchr. f. Hym. & Dipt., in which Mr. Adolphe Ducke has established a new subfamily, the *Pseudepyrinæ*, based upon a new genus discovered in Brazil.

This subfamily, judging from the description alone, is hardly justifiable, all the characters given, except those of the abdomen, agreeing with the *Allocoelinæ*, and I have here merged it with that subfamily.

Table of Subfamilies.

Face more or less convex, never concave; prothorax quadrate, subtrapezoidal or longer than wide, and as long or longer than the mesonotum; abdomen depressed, subconvex or convex beneath, the female with 2 or 4 dorsal segments, the male with 4 or 5 segments ..... 3.

Face more or less concave; prothorax transverse quadrate or rectangular, shorter than the mesonotum; abdomen concave beneath, with 3 dorsal segments, rarely with 4 segments in some males.

Maxillæ and labium normal, the ligula subconical, the galea rounded, obtuse .. .. 2.

Maxillæ and labium abnormal, the ligula and galea very long, produced into a slender, filiform beak, resembling the proboscis of bees, and bent back under the thorax in repose; front wings with the discoidal cell distinct; abdomen in ♀ with 3, in ♂ with 4 segments, the last *without* pits or foveolæ, but with a broad deep submarginal furrow on each side of the apical half; apex of abdomen irregularly denticulate ..... Subfamily I.—Parnopinæ.

2. Third abdominal *with* a submarginal series of pits or foveolæ, contained in a groove or declivity, the apical margin rarely unarmed, most frequently angulate, dentate or serrate; front wings with a distinct discoidal cell; claws simple ... Subfamily II.—Chrysidinæ.

Third abdominal segment *without* a submarginal series of pits or foveolæ in a groove or declivity, the surface therefore entire, smooth; front wings with the discoidal cell frequently wanting or incomplete; claws bifid, serrate or pectinate.

Front wings with the first and second discoidal cells usually more or less present and complete, or at least indicated by fuscous lines; apical margin of the last dorsal segment entire, very rarely undulate or more or less angulate laterally.....Subfamily III.—Hedychrinæ.

Front wings with the first and second discoidal cells wanting, rarely with the second indicated by water lines; apical margin of the last dorsal segment medially excised or truncate—emarginate, rarely entire or subsinuate, scarcely excisely *(Philoctetes)* .....Subfamily IV.—Elampinæ.

3. Metathorax unarmed, the hind angles rounded.....4.

Metathorax with the hind angles acute or toothed; pronotum usually longer than wide, narrowed anteriorly, rarely quadrate.

Pronotum *without* a transverse furrow anteriorly; abdomen in ♀ with 2 or 3 dorsal segments, the apical margin of the last rounded, edentate; claws with one tooth beneath.....Subfamily V.—Allocoelinæ.

Pronotum *with* a transverse furrow anteriorly; abdomen in ♀ with 4 dorsal segments, in ♂ with 5 segments.....Subfamily VI.—Cleptinæ.

4. Pronotum broad, quadrate or subtrapezoidal, usually as long as the mesonotum, rarely a little shorter; abdomen much depressed, the known forms with 4 or 5 distinct dorsal segments.....Subfamily VII.—Amiseginæ.

Subfamily I.—Parnopinæ.

The abnormally lengthened labium and maxillæ, as well as the venation of front wings and the peculiarities of the abdomen, render the subfamily easily recognized.

It is represented at present by a single genus, and all of the species apparently confine their attacks to wasps belonging to the family *Bombicidæ*.

Abdomen in ♀ with 3 segments, in ♂ with 4 segments, the terminal segment minutely denticulate at apex; postscutellum lamelliform, projecting; labium and maxillæ abnormally long ..... Parnopes, Latreille.

(Type Chrysis grandior, Pallas.)

Subfamily II.—Chrysidinæ.

This is the largest and most extensive group in the family. It is easily recognized by the simple, edentate claws, by the front wings having

a distinct discoidal cell, and by the abdomen, which is composed of only 3 visible segments, the third segment always having a groove or declivity before its apex, which is filled with pits or foveolæ, the margin being usually dentate or serrate, rarely simple or unarmed.

The wasps of this subfamily attack principally bees belonging to the families *Anthophoridæ*, *Megachilidæ*, *Andrenidæ* and *Panurgidæ*, and wasps of the family *Eumenidæ*; they also attack those of the families *Pemphredonidæ*, *Philanthidæ*, *Larridæ*, *Sphecidæ* and *Scoliidæ*.

Chryaspis, Saussure, described from Africa, I do not know, nor can I find out where it is described, the Zoological Record, and Dalla Torre, in his catalogue, being deficient in citing the publication. Both give Soc. Entom., II., 1887, p. 25. What entomological society?

Table of Genera.

Head normal, not rostriform; postscutellum normal, the basal part *not* covered by the scutellum.....2.

Head rostriform, the frons narrowed; postscutellum conically produced, the basal part wholly covered by the scutellum.

Postscutellar process excavated; third joint of antennæ *longer* than the fourth.....(1) Stilbum, Spinola.
(Type Chrysis cyanura, Forster.)

Postscutellar process not excavated, convex; third joint of antennæ usually distinctly *shorter* than the fourth.....(2) Pyria, Lepeletier.
(Type Chrysis lyncea, Fabr.)

2. Apical margin of the third dorsal abdominal segment normal, or *without* a pellucid or subcoriaceous membrane.....3.

Apical margin of the third dorsal abdominal segment abnormal, composed of a pellucid or subcoriaceous membrane.....(3) Spintharis, Klug.
(Type S. chrysonota (Klug.), Dahlb.)

3. Front wings *with* a complete discoidal cell.....4.

Front wings *without* a complete discoidal cell.....8.

4. Antennæ, legs and tibial spurs normal.....5.

Antennæ, legs and tibial spurs abnormal.

Apical margin of the third abdominal segment 6-dentate; antennæ with the joints of the flagellum dilated.....(4) Pleurocera, Guerin.
(Type P. viridis, Guerin.)

5. Apical margin of third abdominal segment *not* finely denticulate, entire, notched, or terminating in from one to seven teeth....6.
Apical margin of third abdominal segment finely denticulate or with many teeth.
Front wings with an *incomplete* marginal cell.
Mesopleura bispinose.....(5) Euchrœus, Latreille.
(Type Chrysis purpurata, Fabr.)
Mesopleura normal, unarmed.....Spinola, Dahlbom.
Front wings with a complete marginal cell.
Apex of abdomen with 11 small teeth.....(6) Polydontus, Radoszkowski.
(Type P. Stschurovskyi, Radosz.)

6. Apex of abdomen not terminating in a tooth, entire, undulate, notched or angulate.....7.
Apex of abdomen terminating in from one to seven teeth.
Apical margin of third abdominal segment terminating in 7 teeth.....(7) Heptachrysis, Mocsary.
(Type Chrysis festina, Smith.)
Apical margin of third abdominal segment terminating in 6 teeth.....(8) Chrysis, Linné.
(= Hexachrysis, Licht.)
(Type Chrysis ignita, Linné.)
Apical margin of third abdominal segment terminating in 5 teeth.....(9) Pentachrysis, Lichtenstein.
(Type Chrysis amœna, Eversm.)
Apical margin of third abdominal segment terminating in 4 teeth.....(10) Tetrachrysis, Lichtenstein.
(Type Chrysis aeruyinosa, Dahlb.)
Apical margin of third abdominal segment terminating in 3 teeth.....(11) Trichrysis, Lichtenstein.
(Type Chrysis cyanea, L.)
Apical margin of third abdominal segment terminating in 2 teeth.....(12) Dichrysis, Lichtenstein.
Apical margin of third abdominal segment terminating in a single central tooth.....(13) Monochrysis, Lichtenstein.
(Type Chrysis hybrida, Lepel.)

7. Apical margin of third abdominal segment undulate, notched or angulate.....(14) Gonochrysis, Lichtenstein.
(Type Chrysis albipennis, Klug.)

Apical margin of third abdominal segment entire.....(15) Olochrysis, Lichtenstein.
(Type Chrysis aerata, Dahlb.)

8. Body narrow, slender.....(16) Chrysogona, Förster.
(Type C. gracillima, Förster.

SUBFAMILY III.—Hedychrinæ.

This group is closely allied to the Elampenæ, where Aaron placed it, and probably the slight difference in venation used by Mocsary will not always prove satisfactory. The characters of the claws given by Dahlbom are entirely worthless to separate these wasps from the *Elampinæ*.

The third abdominal segment is always normal, *without* a groove or declivity filled with a submarginal series of pits or foveolæ, and this character separates the group from the *Chrysidinæ*; while from the *Elampinæ* it is usually easily distinguished by the venation of the front wings, the first and second discoidal cells being usually distinct, complete.

The wasps of this subfamily are most frequently bred from the nests of the *Pemphredonidæ* and *Trypoxylidæ*, although they attack other wasps, *Philanthidæ*, *Stizidæ*, and *Sphecidæ*. A few are also recorded from bees, *Megachilidæ*, *Andrenidæ*, *Panurgidæ*, etc.

Table of Genera.

1. Submedian cell *not* longer than the median, the transverse median nervure interstitial with the basal nervure. .....2.

Submedian cell longer than the median, the transverse median nervure originating beyond the basal nervure.

Claws with 4 or more teeth beneath; first and second discoidal cells distinct or indicated by fuscous nervures.....(1) Holopyga, Dahlbom.
(Type H. amœnula, Dahlb.)

2. Claws with one small tooth beneath, at or near the middle; abdomen with the third segment at apex entire or broadly sinuate.....(2) Hedychridium, Abeille.
(Type Chrysis ardens (Latreille), Coquebert.)

Claws cleft or bifid; abdomen with the third segment laterally rather strongly sinuate, and appearing more or less distinctly angulate .....(3) Hedychrum, Latreille.
(Type Sphex nobilis, Scopoli.)

SUBFAMILY IV.—Elampinæ.

This group could only be confused with the *Hedychrinæ*, the only available character to separate it from that group, and probably not a reliable character, being the apparent absence of discoidal cells in the front wings. I have examined many specimens, and in nearly all I can clearly detect these cells by hyaline veins, when examined through a bright light.

Table of Genera.

Postscutellum seen from the side gibbous, convex, subconvex or obtusely produced, rarely subconical..... .....2.

Postscutellum seen from the side acuminately produced into a depressed blade or ledge.

Front femora towards base rectangularly dilated; abdomen with the third segment at apex medially most frequently strongly narrowed, reflexed and truncate; claws with 3–6 teeth.....(1) Notozus, Förster.
(Type Hedychrum spina, Lepel.)

2. Posterior tibiæ normal..... .....3.

Posterior tibiæ in ♂ dilated, compressed.

Abdomen with the third segment at apex undulate or rounded centrally, almost entire, very slightly sinuate, scarcely incised; pronotum declivous before; claws with 3 teeth.....(2) Philoctetes, Abeille.
(Type Elampus micans, Klug.)

3. Abdomen with the third segment at apex medially *not* truncate, and, viewed laterally, not forming a snout-like projection.....4.

Abdomen with the third segment at apex medially truncate, and, as viewed laterally, forming a snout-like projection that appears truncate; seen from behind, it is usually incised or emarginate below.

Surface of the third segment, just above the snout-like projection, produced into a cone-shaped piece forming the direct apex of

a fold which extends on each side just above the apical and lateral margins; claws with 2–3 teeth within.....(3) Diplorrhos, Aaron.
(Type D. plicatus, Aaron.)

Surface of the third segment above the snout-like projection even, *not* produced; claws with two or more teeth; pronotum nearly regularly convex.....(4) Elampus, Spinola.
(Type Sphex auratus, Linné.)

4. Abdomen with the third segment at apex medially more or less distinctly excised; claws with 3–8 teeth beneath.....(5) Pseudomalus, Ashm., g. nov.
(Type Omalus semicircularis, Aaron.)

Abdomen with the third segment at apex rounded, entire; claws with 3 teeth beneath.....(6) Holophris, Mocsary.
(Type H. marginellus, Mocs.)

Subfamily V.—Allocœlinæ.

This subfamily was established by Mocsary. It is allied to the *Cleptinæ*, but is easily distinguished by the absence of a transverse furrow on the pronotum, by the paucity of visible segments in the abdomen, there being only two or three, and by the claws, which are armed with a tooth beneath.

Ducke's recently-established subfamily *Pseudepyrinæ* seems to fall in here.

In the character of the pronotum, the group shows some affinity with the *Amiseginæ*, but from that group it is easily separated by the unidentate claws, the armed metathorax, and by the totally different shaped abdomen.

Table of Genera.

Pronotum twice wider than long; abdomen with three segments, the last with a finely elevated apical margin ..(1) Pseudepyris, Ducke.
(Type P. paradoxa, Ducke.)

Pronotum longer than wide, trapezoidal; abdomen with only two visible segments, the last with the apical margin rounded, edentate.....(2) Allocœlia, Mocsary.
(Type Anthracia capensis, Smith.)

Subfamily VI.—Cleptinæ.

The acute or toothed hind angles of the metathorax separate this subfamily from the *Amiseginæ*, while from the *Allocœlinæ*, to which it is most closely allied, it is separated by the pronotal differences, the pronotum in this group always being divided by a transverse furrow anteriorly.

In venation the group is practically identical with many forms in the family *Bethylidæ*, and this resemblance is so striking that quite recently an eminent French hymenopterist classified *Heterocœlid*, Dahlbom, with the *Bethylidæ*.

All the species bred are recorded from the larvæ of sawflies *(Nematidæ)*.

Table of Genera.

Front wings with the first and second discoidal cells *distinct*, complete ..... 2.

Front wings with the first and second discoidal cells *wanting* or incomplete ..... 3.

2. Eyes large, oval; antennæ *not* inserted on a tubercle; clypeus without a prominent carina; scutum of metathorax visible ..... (1) Cleptes, Latreille.
(Type Sphex semiaurata, Linné.)

Eyes small, rounded; antennæ inserted on a small tubercle; clypeus with a strong prominent carina its entire length; scutum of metathorax wanting ..... (2) Heterocœlia, Dahlbom.

3. Pronotum quadrate, with a transverse arcuate furrow anteriorly; claws with a median tooth beneath ..... (3) Adelphe, Mocsary.
(Type A. mexicana, Mocsary.)

Subfamily VII.—Amiseginæ.

This small group is known at once by the metathorax being unarmed, the hind angles being always rounded, never acute. The pronotum is broad, quadrate, or nearly, usually wider than long, and as long as the mesonotum or a little shorter. The abdomen is much depressed, oval, the known forms having 4 or 5 distinct dorsal segments.

The species can be easily confused with genuine Bethylids, and the connection between these insects and the family *Bethylidæ* is very close.

Table of Genera.

Front wings with two discoidal cells, or at least these are indicated by fuscous streaks ; antennæ 13-jointed.

Pronotum as long or a little longer than the mesonotum, the latter without parapsidal furrows, but with a grooved line at sides just above the tegulæ ; abdomen with 5 visible dorsal segments ; marginal cell open at apex ; discoidal cells usually incomplete, indicated by fuscous streaks.....(1) Mesitiopterus, Ashmead, n. g. (Type M. Kahlii, Ashm.)

Pronotum shorter than the mesonotum, the latter with parapsidal furrows ; abdomen with 4 visible segments ; marginal cell closed ; discoidal cells distinct.. ....(2) Amisega, Cameron. (Type A. cuprifrons, Cam.)

Mesitiopterus Kahlii, n. sp.

♂.—Length 3 mm. Head and thorax bronzed green, punctate, the metanotum smooth, with a median carina ; scape, pedicel and legs, except the middle and hind coxæ, rufous ; abdomen black, the first segment at apex and the large second segment, except at apex, minutely punctate. Wings hyaline, the subcostal vein and the stigma brown-black, the other veins testaceous ; the venation is as in the Bethylid genus *Mesitius*, Spinola, and is also much as in *Cleptes*, Latr.; there are two indistinct discoidal cells represented by slight fuscous streaks.

Type.—Cat. No. 6343, U. S. N. M (Ashmead collection).

Hab.—Kansas, Lawrence. Taken by Mr. Hugo Kahl, July 7, 1896.

Mesitiopterus Townsendi, n. sp.

♂.—Length 2 mm. Head and thorax aeneous black, punctate ; scape of antennæ obclavate, aeneous black, the flagellum dull black ; tips of front and middle tibiæ and their tarsi, except at apex, testaceous, the hind tarsi fuscous, testaceous basally and beneath. Abdomen aeneous black, punctured very nearly as in *M. Kahlii*. Wings subhyaline, hyaline basally, the venation as in previous species.

Type.—Cat. No. 6344, U. S. N. M (Ashmead collection).

Hab.—Mexico, San Rafael, Jicoltepec (Prof. Tyler Townsend).

ON THE TYPE OF THE GENUS COCCUS, L.

BY MRS. C. H. FERNALD, AMHERST, MASS.

The first attempt to separate the species given under *Coccus* in the 10th edition of the Systema Naturæ of Linneus, was made by Geoffroy, in his Histoire Abregée des Insectes, Vol. I. (1762), where he placed a part of them under *Chermes* and left *adonidum* and *phalaridis*, with his new species *ulmi*, under *Coccus*. Of these species only *phalaridis* was given under the genus *Coccus* by Linneus in his 10th edition, and is therefore the only species that could be regarded as the type of *Coccus* so far as Geoffroy is concerned.

In 1802, Latreille, in Vol. III., p. 267, of his Hist. Nat. Crust. Ins., established *hesperidum* as the type of the genus *Coccus*. I have not been able to find that any of the writers between the appearance of the work of Geoffroy and that of Latreille published anything that would fix the type of *Coccus*. Leach in 1815 and Samouelle in 1819 adopted *cacti* as the type, but the statement made by Leach that it "inhabits fruit trees" makes it quite certain that he had under consideration neither *cacti*, L., nor the cochineal insect. Samouelle merely copies Leach. Curtis, in his British Entomology (1838), gives *cacti*, L., as the type, but none of these three authors could affect the question, as the type had already been established by Latreille, if not by Geoffroy, as shown above.

The *phalaridis* of Linneus was so obscure an insect that the author himself could not determine whether it was a *Coccus*, an *Aphis* or a *Chermes*. Fonscolombe, in describing his *Coccus radicum graminis* (Ann. Soc. Ent. Fr. III., 212, 1834), gave the synonymy as follows: *Phalaridis (?)*, Linn., Fab., non *C. phalaridis*, Enc. Meth. nec Geoffr. Prof. Cockerell has suggested the idea that the *phalaridis* of Geoffroy was possibly not the same species as the Linnean insect, which is precisely the same idea that Fonscolombe had, as shown by his synonomy. Since it is probably impossible to prove that Geoffroy had any of the Linnean species of the 10th edition in his restricted genus, the only safe ground will be to adopt the type established by Latreille in 1802, at least till further light is obtained on the identity of *phalaridis*, L., which at present is unknown.

If, therefore, we adopt *hesperidum* as the type of *Coccus*, the genera *Calymnatus* and *Calypticus* of Costa and *Lecanium* of Burmeister will fall